Abstract The high-resolution X-ray spectrum of NGC 3783 shows several dozen absorption lines and a few emission lines from the H-like and He-like ions of O, Ne, Mg, Si, and S as well as from Fe$^{17}$–Fe$^{23}$ L-shell transitions. We have analyzed the Chandra HETGS spectrum using better flux and wavelength calibrations along with more robust methods. Combining several lines from each element, we clearly demonstrate the existence of the absorption lines and determine they are blueshifted relative to the systemic velocity by $-610 \pm 130$ km s$^{-1}$. We find the Ne absorption lines in the High Energy Grating spectrum to be resolved with FWHM = $840^{+360}_{-390}$ km s$^{-1}$; no other lines are resolved. The emission lines are consistent with being at the systemic velocity. We have used regions in the spectrum where no lines are expected to determine the X-ray continuum, and we model the absorption and emission lines using photoionized-plasma calculations. The model consists of two absorption components, with different covering factors, which have an order of magnitude difference in their ionization parameters. The two components are spherically outflowing from the AGN and thus contribute to both the absorption and the emission via P Cygni profiles. The model also clearly requires O7 and O8 absorption edges. The low-ionization component of our model can plausibly produce UV absorption lines with equivalent widths consistent with those observed from NGC 3783. However, we note that this result is highly sensitive to the unobservable UV – to – X-ray continuum, and the available UV and X-ray observations cannot firmly establish the relationship between the UV and X-ray absorbers. We find good agreement between the Chandra spectrum and simultaneous ASCA and RXTE observations. The 1 keV deficit previously found when modeling ASCA data likely arises from iron L-shell absorption lines not included in previous models. We also set an upper limit on the FWHM of the narrow Fe K emission line of $3250 \pm 10$. This is consistent with this line originating outside the broad line region, possibly from a torus.